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GGSIPU mathmatics 2007

1. If (p^ ~r) → (~p^q) is false,then the truth values of p,q and r are respectively

 (a) T,F and F (b) F,F and T

 (c) F,Tand T (d) T,F and T

2. If ~, and ¥ are the roots of equation x^3-8x+8 = 0,then $\sum \sim^{-2}$ and $\sum \frac{1}{\sim}$ are respectively

 (a) 0 and -16 (b) 16 and 8

 (c) -16 and 0 (d) 16 and 0

3. The GCD of 1080 and 675 is

 (a) 145 (b) 135

 (c) 225 (d) 125

4. If a,b and c ∈ N, then which one of the following is not true ?

 (a) a^0b and a^0 c⇒a^0 3b+2c

 (b) a^0b and a^0 c⇒a^0 c

 (c) a^0(b+c)⇒a^0 ba and a ^{0} c

 (d) a^0b and a^0 c⇒a^0 b+c

5. x = 4 (1+cos ¯) and y=3 (1+sin ¯) are the paramatic equations of

 (a) $\frac{(x-3)^2}{9} + \frac{(y-4)^2}{16} = 1$

 (b) $\frac{(x+4)^2}{16} + \frac{(y+3)^2}{9} = 1$

 (c) $\frac{(x-4)^2}{16} - \frac{(y-3)^2}{9} = 1$

 (d) $\frac{(x-4)^2}{16} + \frac{(y-3)^2}{9} = 1$

6. If the distance between the foci and the distance between the directrices of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} =$ 1 are in the ratio 3:2,then a:b is

 (a) $\sqrt{2}$: 1

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(b) $\sqrt{3}:\sqrt{2}$

(c) 1:2

(d) 2:1

7. The ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ have in common

(a) centre only

(b) centre,foci and directrices

(c) centre,foci and vertices

(d) centre and vertices only

8. If sec $^{-}$=m and tan $^{-}$=n, then $\frac{1}{m}[(m+n)+\frac{1}{(m+n)}]$ is

(a) 2 (b) 2m

(c) 2n (d) mn

9. The value of $\frac{\sin 85^0-\sin 35^0}{\cos 65^0}$ is

(a) 2 (b) -1

(c) 1 (d) 0

10. If the length of the tengent from any point on the circle $(x-3)^2+(y+2)^2=5r^2$ to the circle $(x-3)^2+(y+2)^2=r^2$ is 16 unit,then the area between the two circles in sq unit is

(a) 32 ® (b) 4®

(b) 8® (d) 256 ®

11. The equation of the common tangent of the two touching circles $y^2+x^2-6x-12y+37=0$ and $x^2+y^2-6y+7=0$ is

(a) x+y-5 = 0 (b) x-y+5=0

(c) x-y-5=0 (d) x+y+5=0

12. The equation of the parabolas with vertex at (-1,1) and focus (2,1) is

(a) $y^2-2y-12x-11=0$

(b) $x^2+2x-12y+13=0$

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(c) $y^2-2y+12x+11=0$

(d) $y^2-2y-12x+13=0$

13. The equation of the line which is tangent to both the circle $x^2+y^2=5$ and the parabola $y^2=40x$ is

(a) $2x-y\pm5=0$

(b) $2x-y+5=0$

(c) $2x-y-5=0$

(d) $2x+y+5=0$

14. If $2A+3B=\begin{bmatrix}2 & -1 & 4\\ 3 & 2 & 4\end{bmatrix}$ and $A+2B=\begin{bmatrix}5 & 0 & 3\\ 1 & 6 & 2\end{bmatrix}$, then B is

(a) $\begin{bmatrix}8 & -1 & 2\\ -1 & 10 & -1\end{bmatrix}$ (b) $\begin{bmatrix}8 & 1 & 2\\ -1 & 10 & -1\end{bmatrix}$

(c) $\begin{bmatrix}8 & 1 & 2\\ -1 & 10 & -1\end{bmatrix}$ (d) $\begin{bmatrix}8 & 1 & 2\\ 1 & 10 & 1\end{bmatrix}$

15. If $A=\begin{bmatrix}1 & -3\\ 2 & k\end{bmatrix}$ and $A^2-4A+10I=A$, then k is equal to

(a) 0 (b) -4

(c) 4 and not 1 (d) 1 or 4

16. The value of $\begin{vmatrix}x+y & y+z & z+x\\ x & y & z\\ x-y & y-z & z-x\end{vmatrix}$ is equal to

(a) $2(x+y+z)^2$ (b) $2(x+y+z)^3$

(c) $(x+y+z)^3$ (d) 0

17. On the set Q of all rational numbers the operation * which is both associative and commutative is given by a*b,is

(a) a+b+ab (b) a^2+b^2

(c) ab+1 (d) 2a+3b

18. From an aeroplane flying,vertically above a horizontal road,the angles of depression of two consecutive stones on the same side of aeroplane are observed to be 30^0 and 60^0 respectively.The height at which the aeroplane is flying in km is

(a) $\frac{4}{\sqrt{3}}$ (b) $\frac{\sqrt{3}}{2}$

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(c) $\frac{2}{\sqrt{3}}$ (d) 2

19. If the angles of a triangle are in the ratio 3:4:5,then the sides are in the ratio

(a) $2:\sqrt{6}:\sqrt{3}+1$ (b) $\sqrt{2}:\sqrt{6}:\sqrt{3}+1$

(c) $2:\sqrt{3}:\sqrt{3}+1$ (d) 3:4:5

20. if $\cos^{-1} x = \sim$, (0<x<1) and $\sin^{-1}(2x\sqrt{1-x^2}) + \sec^{-1}(\frac{1}{2x^2-1}) = \frac{2\pi}{3}$, than $\tan^{-1}(2x)$ equals

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$

(c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

21. If a>b>0,than the value of $\tan^{-1}\left(\frac{a}{b}\right) + \tan^{-1}\left(\frac{a+b}{a-b}\right)$ depends on

(a) both a and b (b) b and not a

(c) a and not b (d) neither a nor b

22. If A={a,b,c},B={b,c,d} and C={a,d,c}, then (A-B) x (B ą C) is equal to

(a) {(a,c) , (a,d)}

(b) {(a,b) , (c,d)}

(c) {(c,a) , (d,a)}

(d) {(a,c) , (a,d) ,(b,d)}

23. The function f:X → Y defined by f(x) = sin x is one one but not onto,If X and Y are respectively equal to

(a) R and R

(b) [0,®] and [0,1]

(c) $[0,\frac{\pi}{2}]$ and [-1,1]

(d) $[\frac{-\pi}{2},\frac{\pi}{2}]$ and [-1,1]

24. If $\log_4 2+\log_4 4+ \log_4 x+ \log_4 16 = 6$,then value of x is

(a) 64 (b) 4 (c) 8 (d) 32

25. If $S_n = \frac{1}{6.11} + \frac{1}{11.16} + \frac{1}{16.21}$ + ... to n terms then $6S_n$ equals

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(a) $\frac{5n-4}{5n+6}$ (b) $\frac{n}{(5n+6)}$

(b) $\frac{2n-1}{5n+6}$ (d) $\frac{1}{(5n+6)}$

26. The remainder obtained when $(1!)^2+(2!)^2+(3!)^2+....+(100!)^2$ is divided by 10^2 is

(a) 27 (b) 28

(c) 17 (d) 14

27. In the group G={1,5,7,11} under multiplication modulo 12,the solution of 7^{-1} Ă$_{12}$ (x Ă$_{12}$ 11)= 5 is equals

(a) 5 (b) 1

(c) 7 (d) 11

28. A subset of the additive group of real numbers which is not a subgroup is

(a) ({0},+) (b) (Z,+)

(c) (N,-) (d) (Q,+)

29. If $\vec{a} = \hat{i}+\hat{j}$, $\vec{b}= 4\hat{k}-\hat{j}$ and $\vec{r} = \hat{i} + \hat{k}$,then the unit vector in the direction of $3\vec{a} + \vec{b} -2\vec{r}$ is

(a) $\frac{1}{3}(\hat{i}+2\hat{j}+2\hat{k})$

(b) $\frac{1}{3}(\hat{i}-2\hat{j}-2\hat{k})$

(c) $\frac{1}{3}(\hat{i}-2\hat{j}+2\hat{k})$

(d) $\hat{i}+2\hat{j}+2\hat{k}$

30. If $\vec{a}$ and $\vec{b}$ are the two vectors such that $|\vec{a}| = 3\sqrt{3}$, $|\vec{b}| = 4$ and $|\vec{a}+\vec{b}| = \sqrt{7}$,then the angle between $\vec{a}$ and $\vec{b}$ is

(a) 120^0 (b) 60^0

(c) 30^0 (d) 150^0

31. if $\vec{a}$ is vector perpendicular to both $\vec{b}$ and $\vec{c}$,then

(a) $\vec{a}+(\vec{b}+\vec{c}) = \vec{0}$

(b) $\vec{a}\times(\vec{b}+\vec{c}) = \vec{0}$

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(c) $\vec{a} \times (\vec{b} \times \vec{c}) = \vec{0}$

(d) $\vec{a} \cdot (\vec{b} \times \vec{c}) = \vec{0}$

32. If the area of the parallelogram with $\vec{a}$ and $\vec{b}$ as two adjacent sides is 15 sq unit ,than the area of the parallelogram having, $3\vec{a} + 2\vec{b}$ and $\vec{a} + 3\vec{b}$ as two adjacent sides in sq unit is

(a) 120 (b) 105

(c) 75 (d) 45

33. if the lines x+3y-9 = 0, 4x+by-2 = 0 nand 2x-y-4 = 0 are concurrent,then b equals

(a) -5 (b) 5

(c) 1 (d) 0

34. The equation of the circle having x-y-2 = 0 and x-y+2 = 0 as two tangents and x-y=0 as a diameter is

(a) $x^2+y^2+2x-2y+1 = 0$

(b) $x^2+y^2-2x+2y-1 = 0$

(c) $x^2+y^2 = 2$

(d) $x^2+y^2 = 1$

35. A circular sector of parimeter 60 m with maximum area is to be constructed.The radius of the circular arc in meter must be

(a) 20 (b) 5

(c) 15 (d) 10

36. $\int \frac{(x^3+3x^2+3x+1)}{(x+1)^5}$ dx is equal to

(a) $-\frac{1}{(x+1)}+c$ (b) $\frac{1}{5}\log(x+1)+c$

(c) $\log(x+1)+c$ (d) $\tan^{-1} x + c$

37. $\int \frac{cose\, x}{cos^2(1+\log\tan\frac{x}{2})}$ dx is equal to

(a) $\sin^2[1+\log\tan\frac{x}{2}]+c$

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(b) $\tan[1+\log \tan \frac{x}{2}] + c$

(c) $\sec^2[1+\log \tan \frac{x}{2}] + c$

(d) $-\tan[1+\log \tan \frac{x}{2}] + c$

38. The complex number $\frac{(-\sqrt{3+3i})(1-i)}{(3+\sqrt{3i})(i)(\sqrt{3+\sqrt{3i}})}$ when re[presents in the argand diagram is

(a) in the second quadrant

(b) in the first quadrant

(c) on the y-axis (imaginary axis)

(d) on the x-axis (real axis)

39. If $2x=-1+\sqrt{3}i$, then the value of $(1-x^2+x)^6 - (1-x+x^2)^6$ is equal to

(a) 32 (b) -64

(c) 64 (d) 0

40. The modulus and amplitude of $(1 + i\sqrt{3})^8$ are respectively

(a) 256 and $\frac{\pi}{3}$ (b) 256 and $\frac{2\pi}{3}$

(c) 2 and $\frac{2\pi}{3}$ (d) 256 and $\frac{8\pi}{3}$

41. The value of $\lim_{x \to 0} \frac{5^x - 5^{-x}}{2x}$ is

(a) log 5 (b) 0

(c) 1 (d) 2 log 5

42. Which one of the following is not true always ?

(a) if f(x) is not continuous at x=a,then it is not differentiable at x=a

(b) If f(x) is continuous at x= a,then it is differentiable at x=a

(c) If f(x) and g(x) are differentiable at x=a,then f(x) +g(x) is also differentiable at x=a

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(d) If a function f(x) is continuous at x=a,then $\lim_{x \to a} f(x)$ exists

43. $\int \frac{dx}{x\sqrt{x^6-16}}$ is equal to

(a) $\frac{1}{3}\sec^{-1}\left(\frac{x^3}{4}\right)+c$ (b) $\cosh^{-1}\left(\frac{x^3}{4}\right)+c$

(c) $\frac{1}{12}\sec^{-1}\left(\frac{x^3}{4}\right)+c$ (d) $\sec^{-1}\left(\frac{x^3}{4}\right)+c$

44. If $I_1 = \int_0^{\pi/2} x\sin x\,dx$ and $I_2 = \int_0^{\pi/2} x\cos x\,dx$,then which one of the following is true ?

(a) $I_1+I_2 = \frac{\pi}{2}$ (b) $I_1-I_2 = \frac{\pi}{2}$

(d) $I_1+I_2 = 0$ (d) $I_1=I_2$

45. If f(x) is defined [-2,2] by $f(x) = 4x^2-3x+1$ and $g(x) = \frac{f(-x)-f(x)}{x^2+3}$, then $\int_{-2}^{2} g(x)dx$ is equal to

(a) 64 (b) -48 (c) 0 (d) 24

46. The area enclosed between the parabola $y=x^2-x+2$ and the line y=x+2 in sq unit equals

(a) $\frac{8}{3}$ (b) $\frac{1}{3}$

(c) $\frac{2}{3}$ (d) $\frac{4}{3}$

47. The solution of the differential equation $e^{-x}(y+1)dy+(\cos^2 x + \sin^2 x)ydx = 0$ subjected to the condition that y=1 when x=0 is

(a) $Y+\log y+e^x \cos^2 x = c$
(b) $\text{Log}(y+1)+e^x \cos^2 x =1$
(c) $Y+\log y=e^x \cos^2 x$
(d) $(y+1) + e^x \cos^2 x =2$

48. If the curve $y=2x^3+ax^2+bx+c$ passes through the origin and the tengents drawn to it at x= - 1 and x=2 are parallel to the x axis,then the values of a,b and c are respectively

(a) 12,-3 and 0 (b) -3,-12 and 0

(c) -3,12 and 0 (d) 3,-12 and 0

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49. The locus of the point which moves such that the ratio of its distance from two fixed point in the plane is always a constant k(<1) is

(a) hyperbola (b) ellipse

(c) straight line (d) circle

50. The circles $ax^2+ay^2+2g_1 x+2f_1 y+c_1 = 0$ and $bx_2+by^2+2g_2x+2f_2y+c_2=0$ ($a \div 0$ and $b \div 0$)cut orthogonally if

(a) $g_1g_2 + f_1f_2 = ac_1 + bc_2$

(b) $2(g_1g_2 + f_1f_2) = bc_1 + ac_2$

(c) $bg_1g_2 + a f_1f_2 = bc_1 + ac_2$

(d) $g_1g_2 + f_1f_2 = c_1+c_2$

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